

Lake Steward

The newsletter of the WLR Lake Stewardship program Vol. 8, No. 4 Fall 2001



You Can Make a Difference!

Fall for salmon



King County executive Ron Sims with everyone's favorite fish, Bert the Salmon.

In the fall, the return of salmon to the streams of their birth is a spectacular natural wonder of the Pacific Northwest. It is also the time of year for salmon-related activities.


Planting events, salvage workshops, and educational tours abound. Most events are suitable for all ages, and all aid in the recovery of this valuable resource.

Plant a Tree or Two

Planting trees along rivers and stream banks helps fish as well as other wildlife. Trees provide shade and help keep the waters cool. Their roots help hold the banks in place, helping to control runoff and erosion, which keeps the water cleaner. They also provide food and shelter for animals and birds.

You can participate in upcoming planting events as a volunteer tree planter, a family fun way to spend an autumn morning. Upcoming scheduled events include:


- Luther Burbank Wetland Restoration Project on Mercer Island, November 17, 9 a.m.-1 p.m.
- Cavanaugh Pond Restoration near Renton, December 1, 9 a.m.-1 p.m.
- Sammamish River near the Horse Creek area in Bothell, December 1, 10 a.m.-2 p.m.

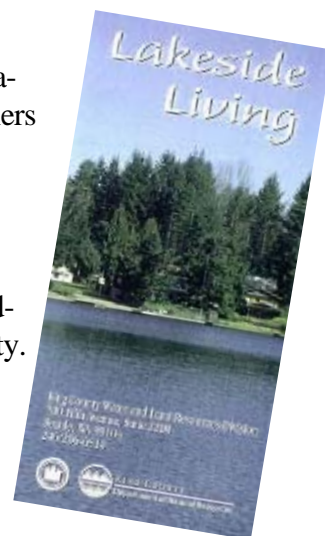
To register or for more information on the first two events, call (206) 296-2990; for information on the Sammamish River Horse Creek planting, call (206) 529-9467. 

Lakeside Living video

Green tips on tape

Lakeside residents looking for ideas, tips, and explanations on "lake-friendly" landscaping practices and others ways to be a good lake neighbor will want to watch *Lakeside Living*. Produced by King County's Water and Land Resources Division, this video is packed with information to get you started on transforming your yard and shoreline into a haven for fish and wildlife, while keeping the values of your lakeside property.

Getting a copy of this terrific resource is easy. Either check it out from your local library, or purchase a copy from the Lake Stewardship program for \$6. To order your copy, please call Suzanne Rowe at (206) 296-1959 for details. 



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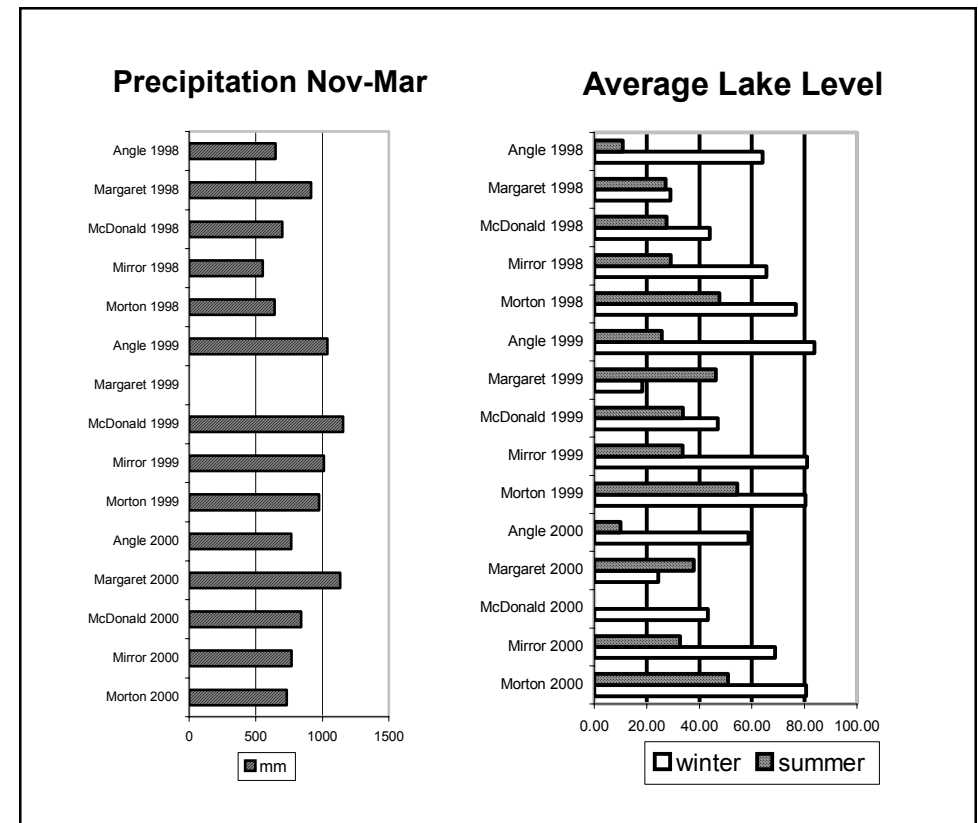
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Lake levels on the rise

Like it or not, the rainy season is here. Some rain will permeate the ground to recharge groundwater supplies, but much of it will flow as surface water directly to your lake, as well as area rivers and streams. Both replenished groundwater and increased surface runoff affect your lake in a very predictable manner. It happens each year around this time—your lake level rises.

The adjacent charts show precipitation and lake level data at five lakes representative of the three watershed types found in King County: urban, suburban, and rural. The rains of winter usually lead directly to higher lake levels. Note how characteristics of different watersheds affect the relationship between rainfall lake levels at various lakes. Lake Margaret, which is in a relatively undeveloped, rural watershed, is a good example. From November 1997 to March 1998, the accumulated precipitation was greater than any other lake. Yet the difference between the average summer level and the average winter level is minimal. This is likely due to relatively low amounts of direct runoff reaching the lake, and relatively high infiltration into the soils of the surrounding watershed. Much of the water in the soils is taken up by vegetation before it ever reaches the lake.

By contrast, Mirror Lake and Angle Lake show rainfall totals similar to other lakes each year,



but dramatic increases in average lake levels during the rainy months. The reason? Both lakes lie within highly developed watersheds with large percentages of impervious surfaces (roads, parking lots, rooftops) that speed rainfall directly to the lowest point of the landscape. Lakes like McDonald and Morton that sit in the middle-ground between highly developed and rural areas show expected results of less lake level fluctuation than urban lakes, and more than rural lakes.

Of course, other watershed attributes help to determine how quickly and dramatically rainfall affects lakes. Generally, lakes fed by a high proportion of groundwater (springs) will exhibit a steadier lake level than those fed

primarily by surface water (rivers and streams). Lakes with associated wetlands will usually rise more slowly than lakes without wetlands nearby.

But some unexpected data still shows up. The 1999 and 2000 Lake Margaret data points from which the charts were derived varied widely in a very short time span. This suggests that something unusual was going on and will need further investigation.

Data used to generate the charts were collected entirely by volunteers, and this represents fraction of the information gathered by dedicated lake-side homeowners. King County depends on citizens to help track the health of lakes and streams. If you would like to monitor your lake, give us a call at (206) 296-8008. 🐾

Salmon Watcher report



The Salmon Watcher Program is a volunteer program that originated in 1996. The program recruits and trains volunteers to identify and watch for spawning salmon throughout the Lake Washington watershed and Central Puget Sound drainages during the fall season. Some regional agencies that participate in the Salmon Watcher Program along with King County include the Bellevue Stream Team, Snohomish County Surface Water Management, and the cities of Issaquah, Kirkland, Redmond, Renton, Seattle, and Woodinville. Individuals, citizen's groups, non-profit organizations, and government agencies all use data from the Salmon Watcher Program for various reasons.

Valuable Data

Volunteers watch for fish on their assigned creeks two times a

week from September through December. The information they collect helps identify where salmon are spawning and where barriers exist to salmon migration.

Pink Salmon

Training sessions are held every year and include a slide show on salmon identification. In addition, field trainings are conducted so volunteers can view fish in streams and learn to identify them with the help of professional biologists. This year at a field training on Cottage Lake Creek, a Pink salmon was spotted! Normally these fish are not found in the Lake Washington watershed, so this was a rare sighting.


2001 Spawning Season

Preliminary numbers for the 2001 spawning season indicate that it is a good year for the endangered chinook. During the month of Sep-

tember, over 350 fish were spotted in nine King County rivers and streams. The highest concentrations have occurred in Issaquah Creek and the Sammamish River.

This year many sockeye also have been spotted by Salmon Watchers. During September, over 880 sockeye were counted, with the largest numbers in Big Bear Creek and the Cedar River.

For More Information

If you would like more information on becoming a volunteer for next year's spawning season or want to know more about this year's count, contact **Michael Murphy** at (206) **296-8008** or visit the Salmon Watcher website at <http://dnr.metrokc.gov/wlr/waterres/salmon/index.htm> 



Ask Dr. Lakenstein

What's involved in water quality monitoring and how does it help my small lake?
— I.C. Fish

Maintaining clean water and healthy lakes in King County is a very important goal. The County relies on a network of volunteers to conduct daily and weekly monitoring activities on many water bodies.

Routine monitoring of water quality, lake level, rainfall, and aquatic plants documents current conditions. Over time, this collective data can establish trends. Monitoring may detect early changes in lake health and indicate the need for additional investigation. The data may also point to a larger watershed problem and lead to corrective action.

At lakes Beaver, Cottage, Desire, Sawyer and Twelve, volunteer monitoring data helped document water quality concerns and obtain community support in grant applications. The result was public funding to create lake management plans. At lakes Killarney, Lucerne, Pipe, and Wilderness, data was used to apply for grants for aquatic plant management projects.

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Changing seasons part of lake cycle

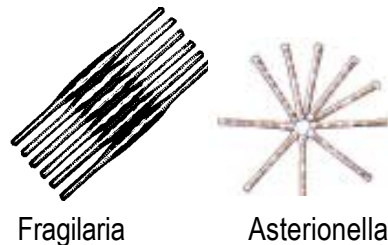
As a lake resident, you probably observe the seasonal changes in rainfall, lake clarity, plant growth and water quality. Volunteer monitors measure seasonal changes, which helps to track patterns in lake conditions. Understanding these patterns aids in the identification of abnormal conditions on lakes, distinguishing them from typical seasonal fluctuations.

Temperature

As air temperature changes, so does water temperature. The amount of water in a lake and surface inflows influence lake temperature; typically our lakes are coldest between December and February.

During the winter, lake water has near-uniform temperatures throughout the water column. In the spring, water temperature increases with warmer air temperatures and longer days. The lake water begins to make three temperature layers ("stratify") in March or April, which remain stable through the summer with the warmest waters on top, the coolest at the bottom of the lake. In the

Figure 1: Algae Commonly found in King County Lakes during Spring



fall, as the surface water cools, the layers mix together again. Temperature is one factor that influences the kinds of algae that grow in lakes.

Secchi Depth

Algal growth and suspended sediment influence lake clarity which can be measured by the depth at which a disk ("Secchi") disappears from view. For many lakes, Secchi depth decreases during the spring growing season and remains shallow during the summer. Secchi depth is generally deeper during the winter, although there may be periods of decreased clarity from stormwater runoff. Sometimes winter algal blooms may result in shallow Secchi depth readings as well.

Nutrients

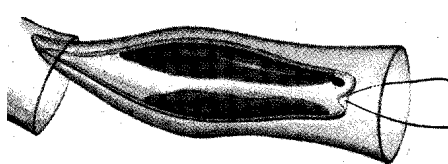
Nutrient dynamics can be characterized seasonally, although many factors influence them through the year. During winter, nutrient levels increase as watershed runoff brings material into the lake. During the summer, nutrients may be added by using fertilizers in the watershed. In the late fall, additions from naturally elevated internal recycling of nutrients from lake sediments occurs as the water mixes.

During the summer, lower nutrient concentrations are typically found in the lake's warm upper water layer as algae grow and use them up. Higher concentrations are found in the cool bottom layer where algae are not active. During the winter months, nutrient concentrations are typically uniform throughout the water column because uniform temperature keeps the water mixing.

Chlorophyll *a*

Plant growth depends on nutrient availability, temperature, and light. Chlorophyll *a*, which is sometimes used as a measure of algal growth, is highest during the late spring or early summer for many lakes but this depends on the type of algae that dominates in a lake. Usually by late summer, nutrient concentrations in the upper water have depleted, and fewer algae are present in the water column. This results in lower chlorophyll *a* concentrations. Chlorophyll *a* concentrations are often lowest through the winter months because low light and cool temperatures limit algal growth.

Figure 2: Algae Commonly found in King County Lakes during Summer



Dinobryon



Peridinium

Phosphorus in your lake

Two primary nutrients for plants are phosphorus and nitrogen. The more nutrients available to plants, the better they grow.

In most fresh water systems in the Northwest, phosphorus is less abundant than nitrogen. When light and water temperature are favorable, but the phosphorus supply runs out, plant growth slows or stops. However, when the phosphorus supply increases, plant growth increases, which can result in unpleasant and sometimes even toxic algal blooms. Managing phosphorus levels in lakes is one way to keep this from happening.

Where Does Phosphorus Come From?

Phosphorus is found naturally in all organic matter, alive or dead, as well as dissolved in water. Lake Stewardship volunteers collect water samples that are analyzed for total phosphorus (TP), but the most readily available phosphorus for algae is the dissolved form (SRP).

Phosphorus also binds readily with iron in soils and sediments. This can become a problem for lakes in late fall. When bottom waters become low in oxygen, the iron-phosphorus bond is broken and phosphorus is released into deep water. When the lake water mixes as temperature drops, the

phosphorus spreads throughout the water column, sometimes triggering new algal blooms.

In addition, aquatic plants (and algae) die back and decay in late autumn as the growing season ends. Phosphorus from the plants is released back into the water column.



The soapy runoff from washing your car at home can add phosphorus to nearby lakes.

Other Sources of Phosphorus

Phosphorus from animal feces can be a troublesome source of nutrients to lakes. For example, when a population of waterfowl becomes too large or when farm animals have free range near a stream or lake, fecal runoff enters nearby surface waters. Pets also contribute nutrients when their waste is left to wash into surface waters. Human feces can

contribute phosphorus when septic systems fail.

Synthetic detergents and fertilizers can be a source of SRP. Household cleansers flushed down the drain into a septic system end up in nearby waters, since drainfields are not designed for phosphorus removal. Washing your car at home can also add phosphorus to nearby surface waters or groundwater. Soluble fertilizers are easily washed into lakes and streams from our gardens.

A Good Balance

If a lake's ecosystem is in balance, algal growth is kept in check by the tiny animals (zooplankton) that eat algae. Increasing nutrients can unbalance the system and undesirable algae such as cyanobacteria may become dominant. Blue-greens are often unpalatable to zooplankton, as well as simply being hard to eat. They also float, forming unsightly surface scums. Occasionally, blue-green algae will produce toxins that cause skin irritation and illness in humans, but have been known to kill other animals.

Once phosphorus enters a lake, it may recycle annually between plant growth, decay, and sediment release. It can take years before it is flushed out of a lake. The best way to protect your lake from increases in phosphorus is to prevent it from entering the water in the first place. 🐸

Ask the Dr. . .

(continued from page 3)

Monitoring lake health also supports homeowner and lake association stewardship activities. Data gathered by volunteers can help answer questions from citizens, consultants, and government agencies on water quality, flooding problems, and aquatic plant distribution of individual lakes.

Lake protection depends on lakefront residents, recreational water users, and watershed associations working together. The Lake Stewardship program is always looking for volunteers to monitor King County lakes. If you would like to get your feet wet and learn more about your lake's unique ecology, contact Michael Murphy at (206) 296-8008. 🐾

Transitions in the Lake Stewardship Program

Last month Sharon Walton, the manager of the Lake Stewardship program, left King County to take a job at a private consulting firm. Wendy Cooke Miller has also moved on, returning to school to study graphic design. Sharon and Wendy leave King County after spending years establishing the volunteer monitoring program, a vital part of the lake stewardship activities that the County oversees. Sharon and Wendy were sad to depart, but both are excited about their new endeavors.

Welcome Sally Abella!

While we will miss Sharon and Wendy, we have wasted no time hiring Sally Abella to lead the program. Sally has spent more than 25 years doing research on lakes in western Washington. She has a wide range of experience in limnology and looks forward to working with the volunteers and building upon the already successful Lake Stewardship program. Sally can be reached by phone at (206) 296-8382 or via email at sally.abella@metrokc.gov. We are currently interviewing for Wendy's position and will announce that appointment in a future newsletter.



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